

FIG. 1

ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		WAVEGUIDE IN FIGURE 1	
	#	DESCRIPTION	#	DESCRIPTION
SiO ₂	44	Buried oxide	44	Cladding
Silicon (45)	161	Body of transistor	151	Core
SiO ₂	1	Sidewall passivation	1	Cladding
SiO ₂	15	Field oxide	15	Cladding
SiO ₂	2	Oxide spacer	2	Cladding
Si ₃ N ₄	3	Salicide block	3	Cladding
SiO ₂	4	Contact punch-through	#	Cladding
SiO ₂	5	Inter-layer dielectric (ILD)	5	Cladding

FIG. 1A

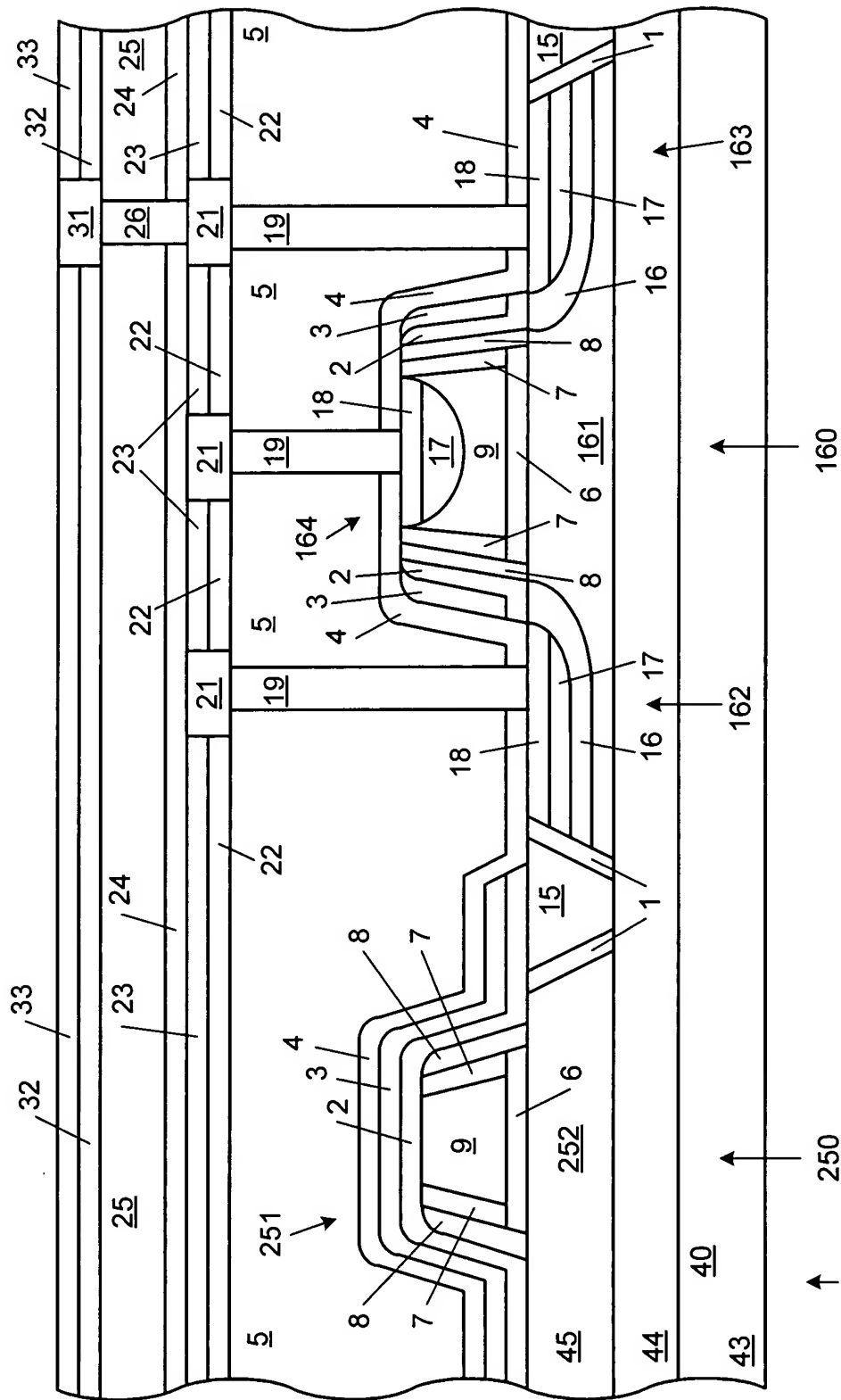


FIG. 2

ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN Figs. 1,2		WAVEGUIDE IN FIGURE 2	
	#	DESCRIPTION	#	DESCRIPTION
SiO ₂	44	Buried oxide	44	Cladding
Silicon (45)	161	Body of transistor	252	Portion of core
SiO ₂	1	Sidewall passivation	1	Cladding
SiO ₂	15	Field oxide	15	Cladding
SiO ₂	6	Gate oxide	6	Portion of core
Poly	9	Gate	9	Portion of core
SiO ₂	7	Sidewall passivation	7	Cladding
SiO ₂	8	Part of gate spacer	8	Cladding
SiO ₂	2	Oxide spacer	2	Cladding
Si ₃ N ₄	3	Salicide block	3	Cladding
SiO ₂	4	Contact punch-through	4	Cladding
SiO ₂	5	Inter-layer dielectric (ILD)	5	Cladding

FIG. 2A

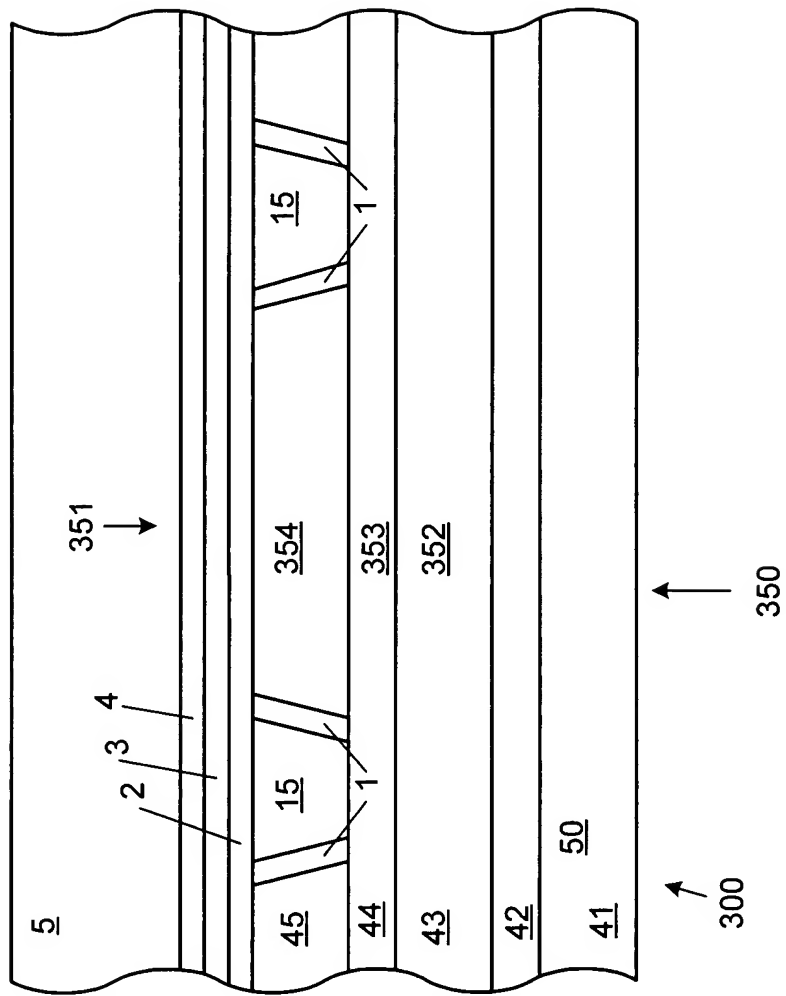


FIG. 3

ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		WAVEGUIDE IN FIGURE 3	
	#	DESCRIPTION	#	DESCRIPTION
SiO ₂	44	Buried oxide	353	Portion of core
Silicon (45)	161	Body of transistor	354	Portion of core
SiO ₂	1	Sidewall passivation	1	Cladding
SiO ₂	15	Field oxide	15	Cladding
SiO ₂	2	Oxide spacer	2	Cladding
Si ₃ N ₄	3	Salicide block	3	Cladding
SiO ₂	4	Contact punch-through	4	Cladding
SiO ₂	5	Inter-layer dielectric (ILD)	5	Cladding

FIG. 3A

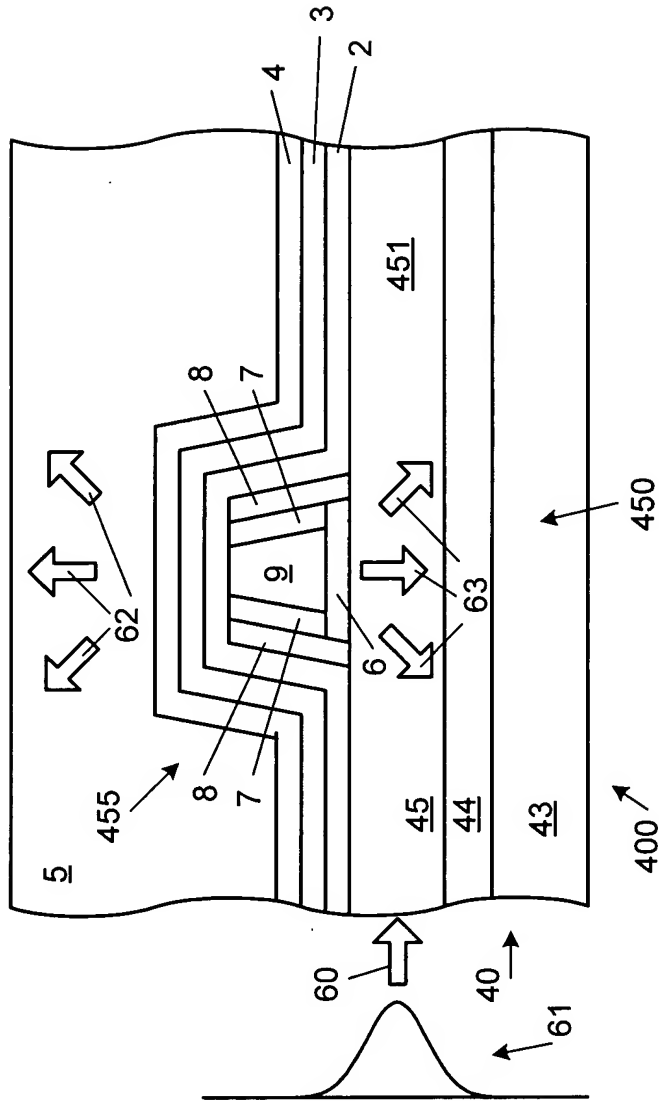


FIG. 4

ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		WAVEGUIDE and LIGHT SCATTERING ELEMENT IN FIGURE 4	
	#	DESCRIPTION	#	DESCRIPTION
SiO ₂	44	Buried oxide	44	Cladding
Silicon (45)	161	Body of transistor	451	Core
SiO ₂	1	Sidewall passivation	1	Cladding
SiO ₂	15	Field oxide	15	Cladding
SiO ₂	6	Gate oxide	6	Part of cladding and light scattering element
Poly	9	Gate	9	"
SiO ₂	7	Sidewall passivation	7	"
SiO ₂	8	Part of gate spacer	8	"
SiO ₂	2	Oxide spacer	2	"
Si ₃ N ₄	3	Salicide block	3	"
SiO ₂	3	Contact punch-through	4	"
SiO ₂	5	Inter-layer dielectric (ILD)	5	"

FIG. 4A

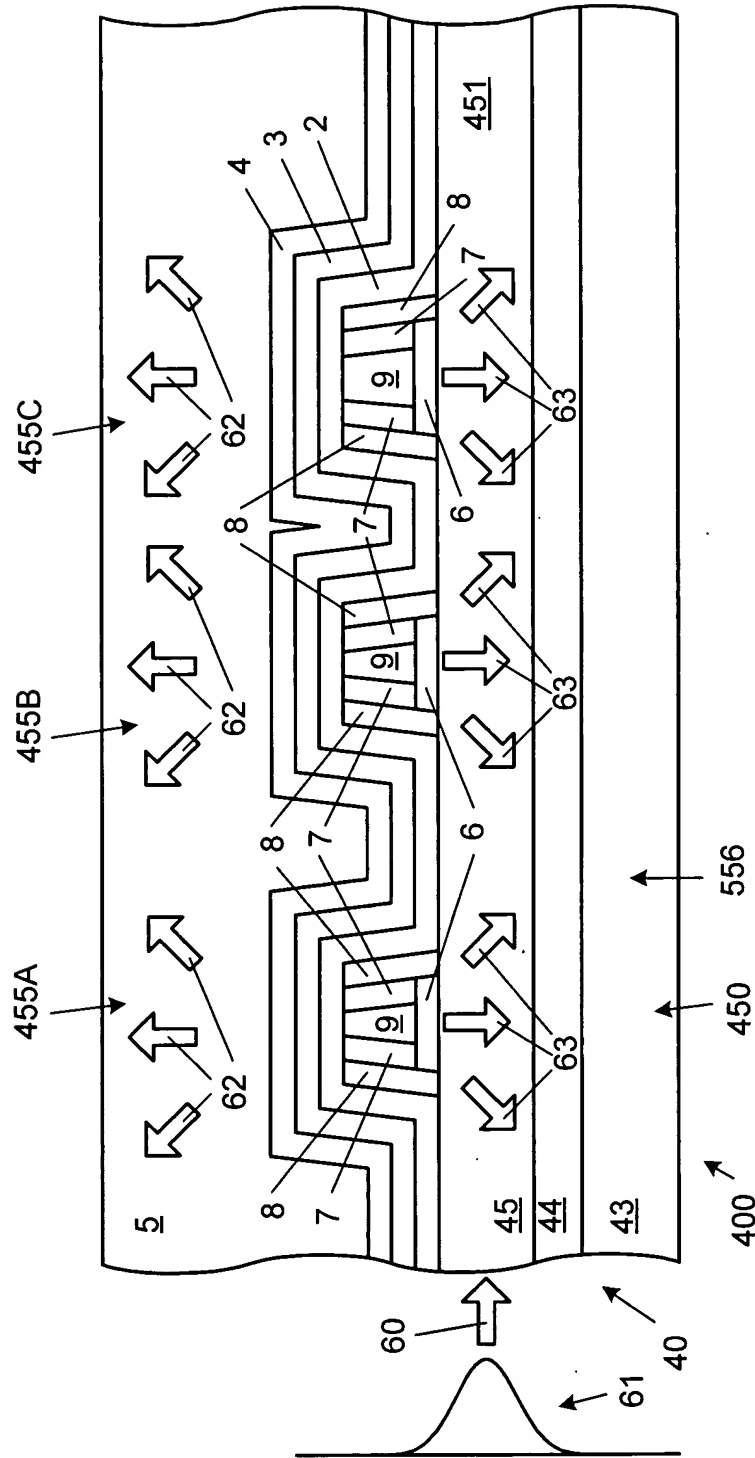


FIG. 5

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ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		WAVEGUIDE and LIGHT SCATTERING ELEMENTS IN FIGURE 5	
	#	DESCRIPTION	#	DESCRIPTION
SiO ₂	44	Buried oxide	44	Cladding
Silicon (45)	161	Body of transistor	451	Core
SiO ₂	1	Sidewall passivation	1	Cladding
SiO ₂	15	Field oxide	15	Cladding
SiO ₂	6	Gate oxide	6	Part of cladding and light scattering elements
Poly	9	Gate	9	"
SiO ₂	7	Sidewall passivation	7	"
SiO ₂	8	Part of gate spacer	8	"
SiO ₂	2	Oxide spacer	2	"
Si ₃ N ₄	3	Salicide block	3	"
SiO ₂	4	Contact punch-through	4	"
SiO ₂	5	Inter-layer dielectric (ILD)	5	"

FIG. 5A

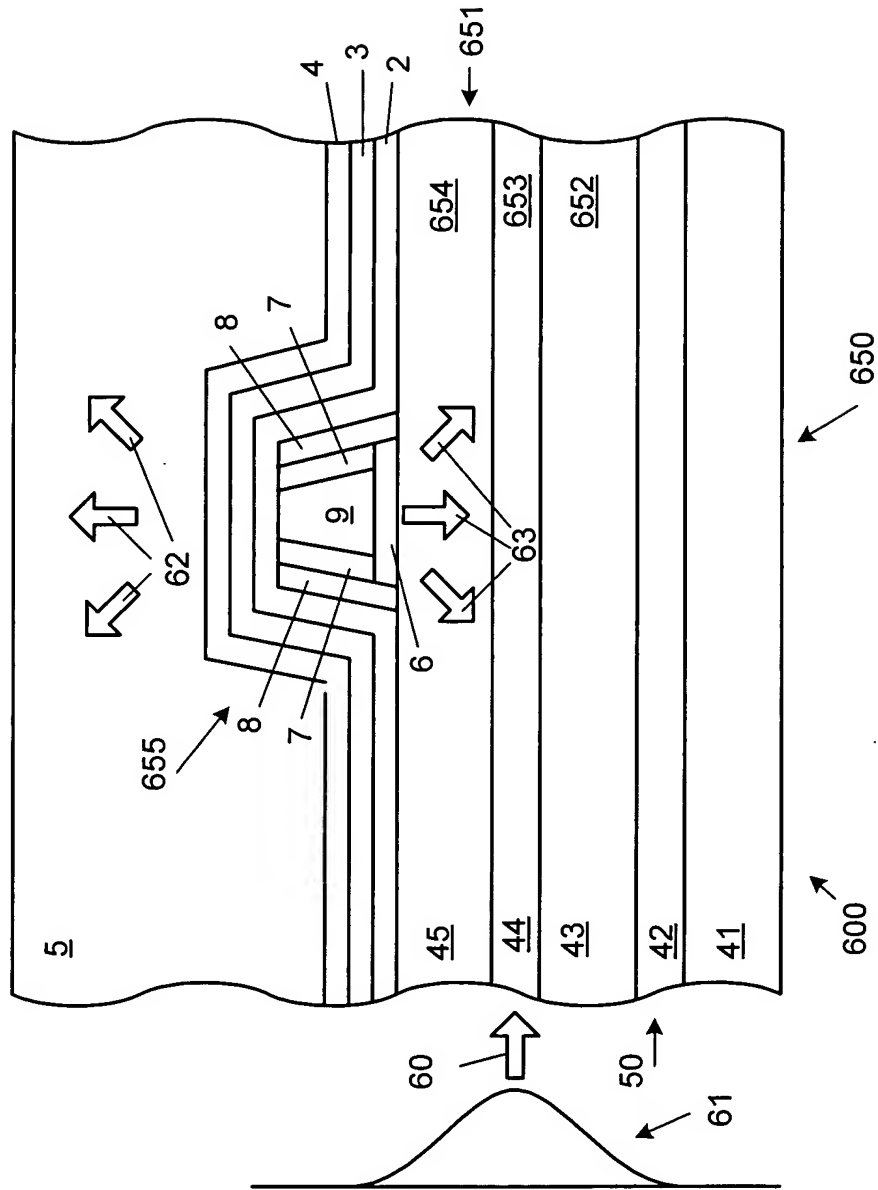


FIG. 6

ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		WAVEGUIDE and LIGHT SCATTERING ELEMENT IN FIGURE 6	
	#	DESCRIPTION	#	DESCRIPTION
SiO ₂	44	Buried oxide	653	Portion of core
Silicon (45)	161	Body of transistor	654	Portion of core
SiO ₂	1	Sidewall passivation	1	Cladding
SiO ₂	15	Field oxide	15	Cladding
SiO ₂	6	Gate oxide	6	Part of cladding and light scattering element
Poly	9	Gate	9	"
SiO ₂	7	Sidewall passivation	7	"
SiO ₂	8	Part of gate spacer	8	"
SiO ₂	2	Oxide spacer	2	"
Si ₃ N ₄	3	Salicide block	3	"
SiO ₂	4	Contact punch-through	4	"
SiO ₂	5	Inter-layer dielectric (ILD)	5	"

FIG. 6A

ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		WAVEGUIDE and LIGHT SCATTERING ELEMENT IN FIGURE 7	
	#	DESCRIPTION	#	DESCRIPTION
SiO ₂	44	Buried oxide	44	Cladding
Silicon (45)	161	Body of transistor	751	Core
SiO ₂	1	Sidewall passivation	1	Part of cladding and light scattering element
SiO ₂	15	Field oxide	15	"
SiO ₂	2	Oxide spacer	2	Cladding
Si ₃ N ₄	3	Salicide block	3	Cladding
SiO ₂	4	Contact punch-through	4	Cladding
SiO ₂	5	Inter-layer dielectric (ILD)	5	Cladding

FIG. 7A

ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		WAVEGUIDE and LIGHT SCATTERING ELEMENT IN FIGURE 8	
	#	DESCRIPTION	#	DESCRIPTION
SiO ₂	44	Buried oxide	44	Cladding
Silicon (45)	161	Body of transistor	852	Portion of core
SiO ₂	1	Sidewall passivation	1	Cladding
SiO ₂	15	Field oxide	15	Cladding
SiO ₂	6	Gate oxide	6	Portion of core
Poly	9	Gate	9	Portion of core
SiO ₂	7	Sidewall passivation	7	Part of cladding and light scattering element
SiO ₂	8	Part of gate spacer	8	"
SiO ₂	2	Oxide spacer	2	"
Si ₃ N ₄	3	Salicide block	3	"
SiO ₂	4	Contact punch-through	4	"
SiO ₂	5	Inter-layer dielectric (ILD)	5	"

FIG. 8A

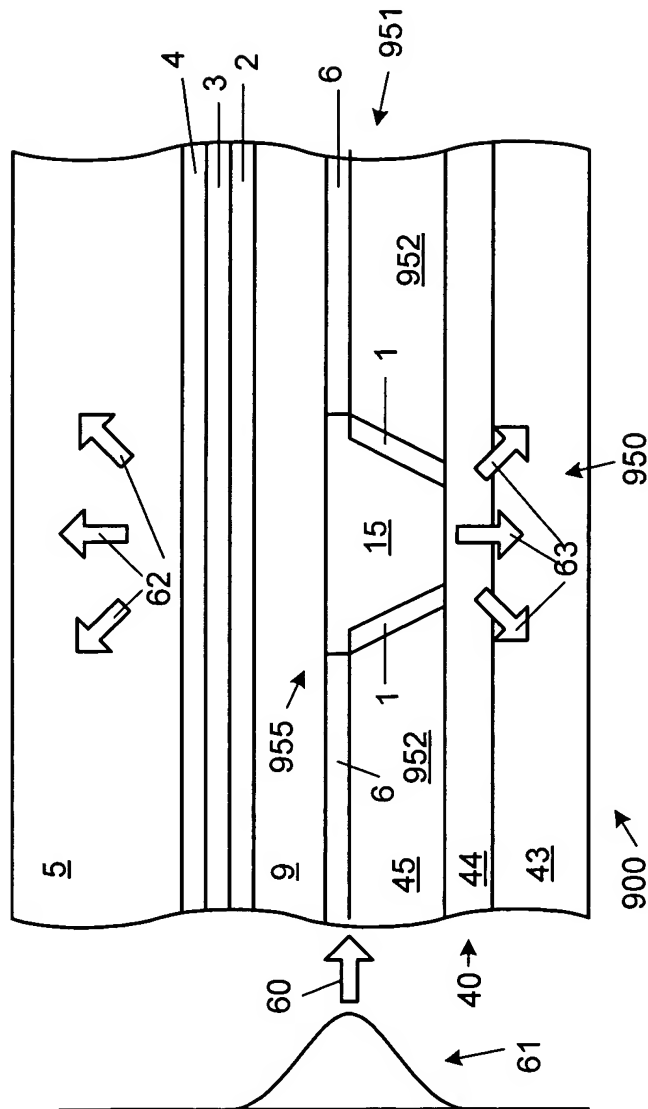


FIG. 9

ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		WAVEGUIDE and LIGHT SCATTERING ELEMENT IN FIGURE 9	
	#	DESCRIPTION	#	DESCRIPTION
SiO ₂	44	Buried oxide	44	Cladding
Silicon (45)	161	Body of transistor	952	Portion of core
SiO ₂	1	Sidewall passivation	1	Part of cladding and light scattering element
SiO ₂	15	Field oxide	15	"
SiO ₂	8	Gate oxide	8	Portion of core
Poly	9	Gate	9	Portion of core
SiO ₂	7	Sidewall passivation	7	Cladding
SiO ₂	8	Part of gate spacer	8	Cladding
SiO ₂	2	Oxide spacer	2	Cladding
Si ₃ N ₄	3	Salicide block	3	Cladding
SiO ₂	4	Contact punch-through	4	Cladding
SiO ₂	5	Inter-layer dielectric (ILD)	5	Cladding

FIG. 9A

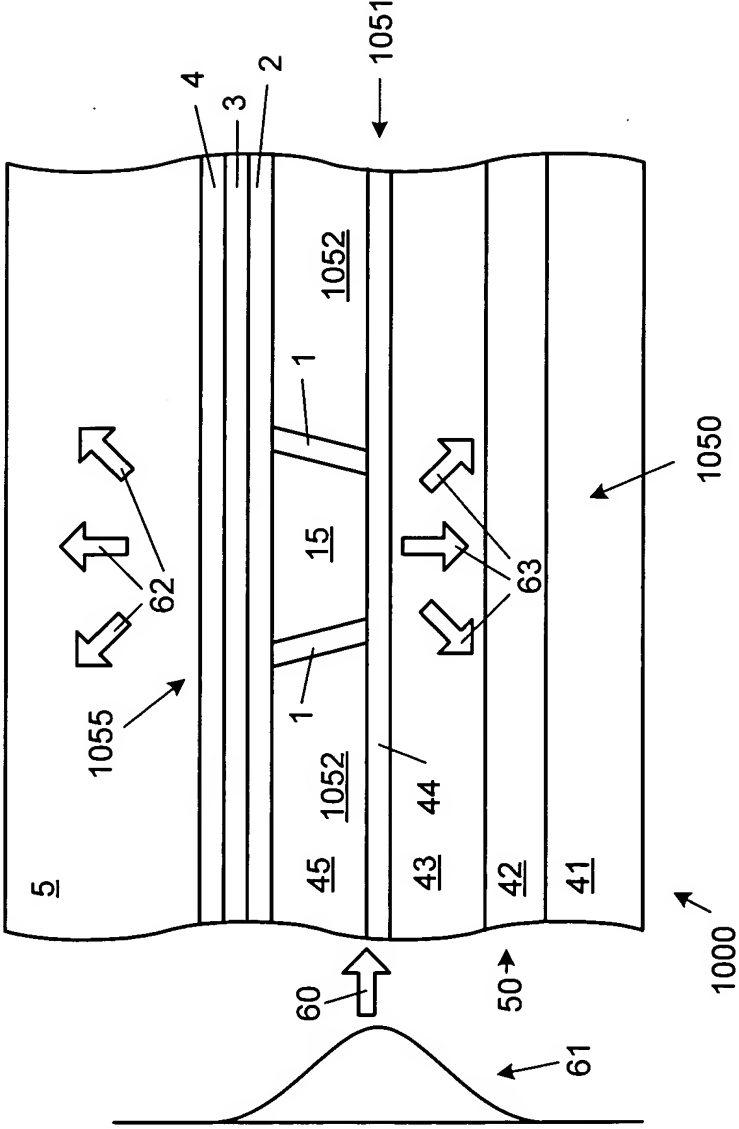


FIG. 10

ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		WAVEGUIDE and LIGHT SCATTERING ELEMENT IN FIGURE 10	
	#	DESCRIPTION	#	DESCRIPTION
SiO ₂	44	Buried oxide	1053	Portion of core
Silicon (45)	161	Body of transistor	1054	Portion of core
SiO ₂	1	Sidewall passivation	1	Part of cladding and light scattering element
SiO ₂	15	Field oxide	15	"
SiO ₂	2	Oxide spacer	2	Cladding
Si ₃ N ₄	3	Salicide block	3	Cladding
SiO ₂	4	Contact punch-through	4	Cladding
SiO ₂	5	Inter-layer dielectric (ILD)	5	Cladding

FIG. 10A

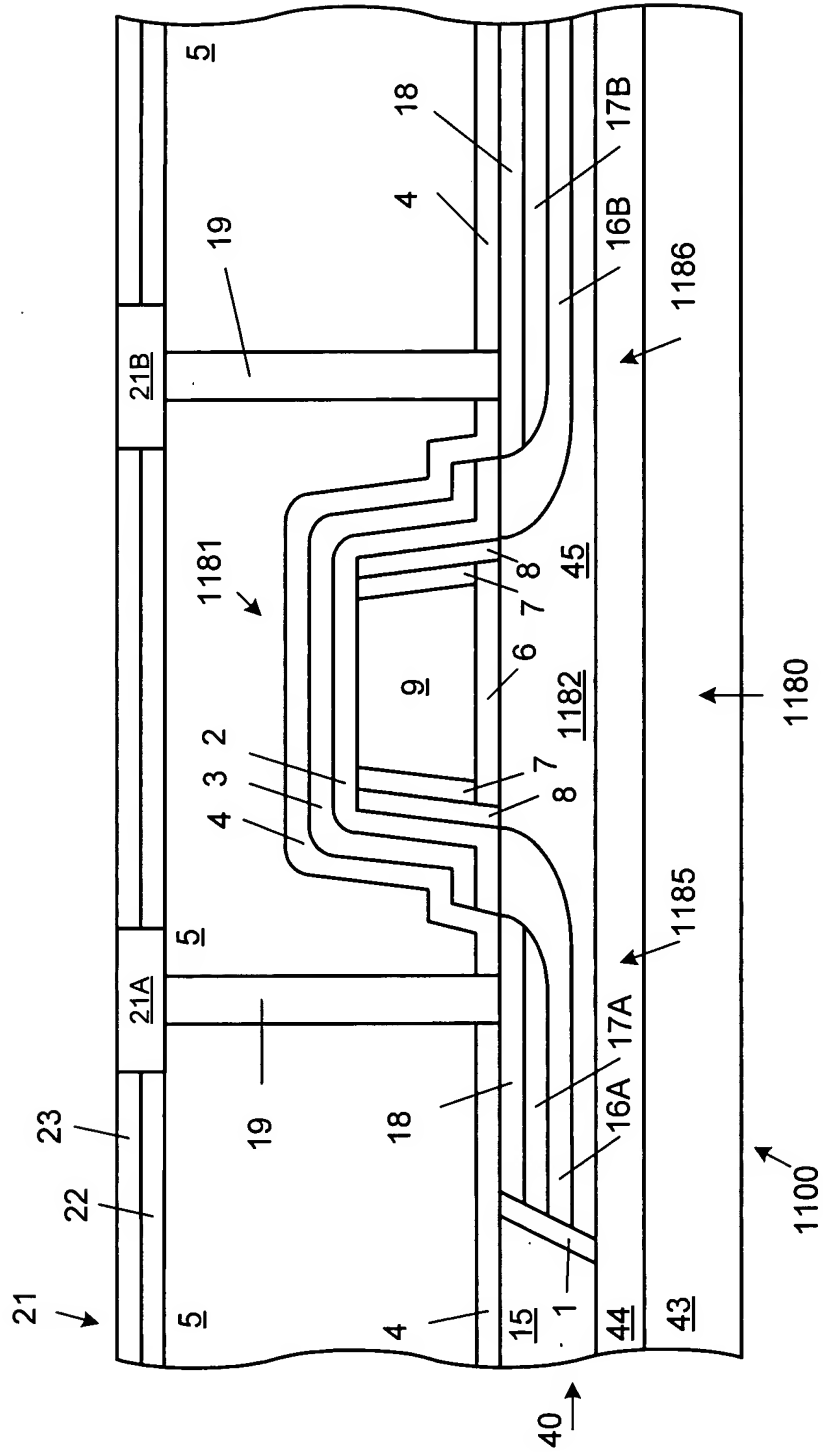


FIG. 11

ELEMENTS OF INTEGRATED COMPONENTS				
FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		ACTIVE WAVEGUIDE IN FIG. 11	
	#	DESCRIPTION	#	DESCRIPTION
SiO ₂	44	Buried oxide	44	Cladding
Silicon (45)	161	Body of transistor	1182	Portion of core
Dopant	161	Well implant into body	1182	Implant into silicon of core
SiO ₂	1	Sidewall passivation	1	Cladding
SiO ₂	15	Field oxide	15	Cladding
SiO ₂	6	Gate oxide	6	Portion of core
Poly	9	Gate	9	Portion of core
SiO ₂	7	Sidewall passivation	7	Cladding
SiO ₂	8	Part of gate spacer	8	Cladding
Dopant	16	Extension implants	16	Extension implants
SiO ₂	2	Oxide spacer	2	Cladding
Si ₃ N ₄	3	Salicide block	3	Cladding
Dopant	17	S, D and G implants	17	S and D implants
Cobalt silicide	18	S, D and G contacts	18	S and D contacts
SiO ₂	4	Contact punch-through	4	Cladding
Tungsten	19	Conductive plugs	19	Conductive plugs
SiO ₂	5	Inter-layer dielectric (ILD)	5	Cladding

FIG. 11A

ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		ACTIVE WAVEGUIDE IN FIG. 12	
	#	DESCRIPTION	#	DESCRIPTION
SiO ₂	44	Insulator	1293	Portion of core
Silicon (45)	161	Body of transistor	1294	Portion of core
Dopant	161	Well implant into body	1292	Implant into silicon of core
SiO ₂	1	Sidewall passivation	1	Cladding
SiO ₂	15	Field oxide	15	Cladding
SiO ₂	2	Oxide spacer	2	Cladding
Si ₃ N ₄	3	Salicide block	3	Cladding
Dopant	17	S, D and G implants	17	S and D implants
Cobalt silicide	18	S, D and G contacts	18	S and D contacts
SiO ₂	4	Contact punch-through	4	Cladding
Tungsten	19	Conductive plugs	19	Conductive plugs
SiO ₂	5	Inter-layer dielectric (ILD)	5	Cladding

FIG. 12A

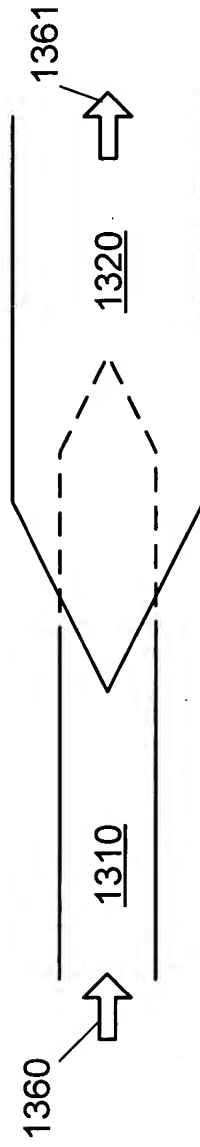


FIGURE 13

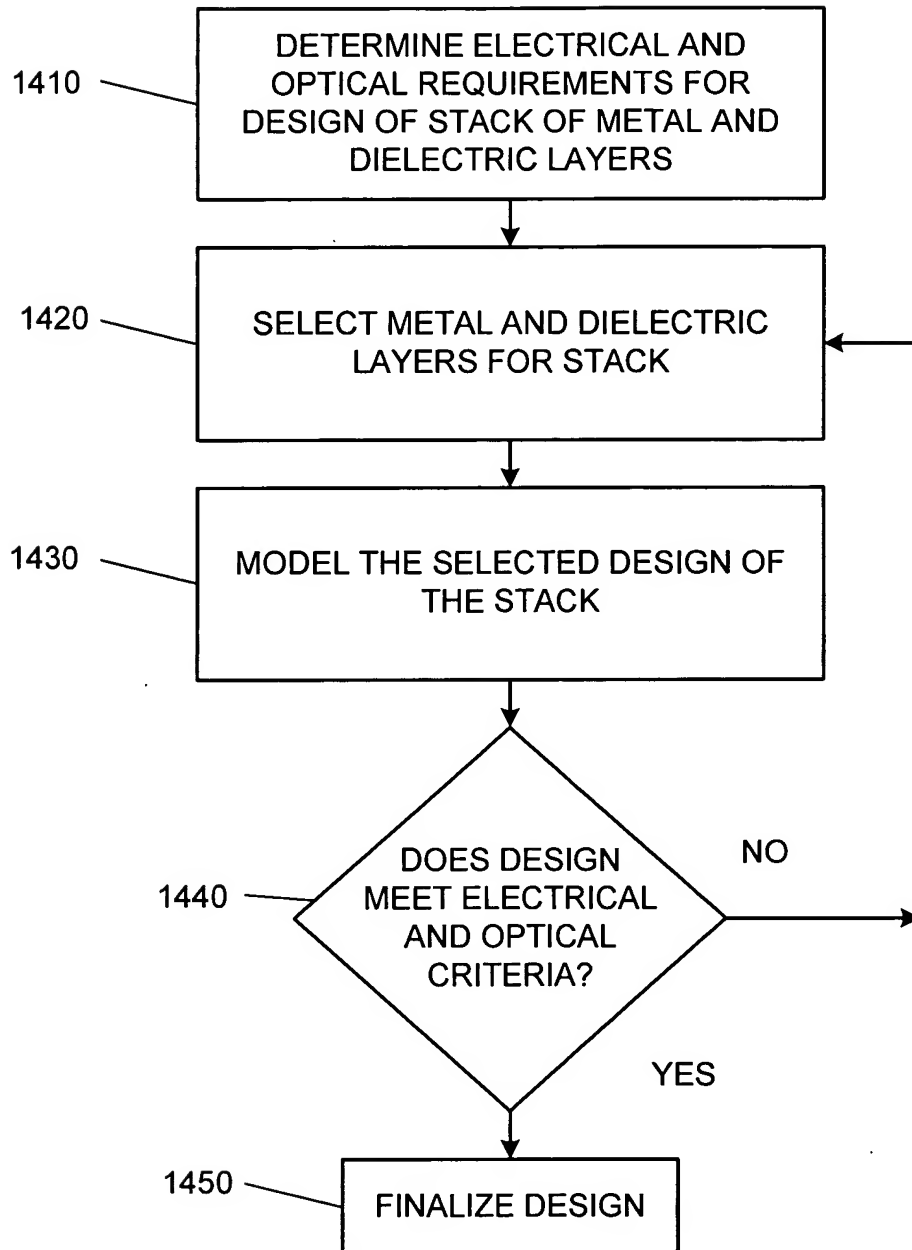


FIGURE 14